UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/829,430	04/21/2004	Michael Edward Schaffer	MD1080USCNT	8774

23906 7590 04/05/2007

E I DU PONT DE NEMOURS AND COMPANY
LEGAL PATENT RECORDS CENTER
BARLEY MILL PLAZA 25/1128
4417 LANCASTER PIKE
WILMINGTON, DE 19805

EXAMINER	
WHALEY, PABLO S	
ART UNIT	**PAPER NUMBER**
1631	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/05/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/829,430	SCHAFFER ET AL.	
	Examiner	Art Unit	
	Pablo Whaley	1631	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 January 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-10* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *21 April 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *08/23/2004*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

APPLICANT'S ELECTION

Applicant's election, filed on 09/25/2006, of SEQ ID NO: 11 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)). However, this election is hereby withdrawn for purposes of expedience of prosecution.

Applicants' election with traverse, filed 01/08/2007, of a "first nucleic acid which is a lectin gene" and a "second target nucleic acid which is a 35S CaMV promoter", as in claim 7, is acknowledged. Applicant's arguments that the restriction is improper as the Examiner has not addressed whether the application claims a "single inventive concept" is persuasive after further consideration. This restriction is hereby withdrawn. Applicant timely traversed the restriction (election) requirement in the reply filed on 01/08/2007.

CLAIMS UNDER EXAMINATION

An action on the merits claims 1-10 follows.

INFORMATION DISCLOSURE STATEMENT

The information disclosure statement filed 08/23/2004 has been considered in full.

DRAWINGS

Drawings filed 4/21/2004 have been accepted.

OBJECTIONS

The disclosure is objected to because of the following informalities:

It is noted that improper periods are present in claims 1-4. These improper periods are in part designations, such as A., B. etc. A claim may have a period in abbreviations and must have a period at the end, but any other period(s) within a claim are improper. It is suggested to amend the claims to cite parts with parentheses, such as (A) or A). Appropriate correction is required.

CLAIM REJECTIONS - 35 USC § 112, 2nd Paragraph

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1 and 2 recite the limitation "wherein the melting of the target nucleic acid molecule starts at a temperature..." in the preamble. It is unclear if this is intended to be an active method step directed to "melting", a further limitation of the target nucleic acid molecule, or otherwise. Clarification is requested. Claims which are directly or indirectly dependent from claim 1 are also included as rejected herein due to said dependence.

In claim 1, step vi, the parameter "C_T" is set forth but not specifically defined anywhere in the claim. It is noted that several T parameters with various subscripts are set forth in claim 1, but there is no clear relationship between said the parameter "C_T" with any one of these

apparently differing parameters. It is acknowledged that the obtaining of a parameter "C_T" value is described in part B. of claim 1 whether this parameter is different from the "C_T" value utilized in part A., subpart vi), or not. Clarification as to the intended metes and bounds for said parameter "C_T" is requested via clearer claim language. Claims which are directly or indirectly dependent from claim 1 are also included as rejected herein due to said dependence.

Claims 1 and 2 also recite several other parameters which are undefined, such as "T_{MS}" and "T_E". Clarification via clearer claim language is requested.

Claim 6 recites the limitation "from a pathogenic organisms." It is unclear as to whether applicant intends for this limitation to be a single organism or plural organisms. Clarification is requested via clearer claim language.

Claim 9 appears to contain two claims therein (both claims 1 and 9). Therefore it is unclear in what way this claim further limits the method of parent claim 1. Clarification is requested via clearly claim language.

Claims 9 and 10 both recite language such that they depend from themselves, respectively. Therefore it is unclear in what way these claims further limits the method of parent claim 1. Clarification is requested via clearly claim language.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claim 1 is rejected under 35 U.S.C. 102(e)(2) as being anticipated by Wittwer et al. (US 6,303,305, Filed: Mar. 30, 1999).

Wittwer et al. teach a method for quantitatively analyzing an amplifiable or self-replicating system, wherein the amount of amplification or self replication product is measured continuously [Abstract], as in claim 1. More specifically, Wittwer et al. teach establishing standard curves representing fluorescence measurements of amplified target nucleic acid [Fig. 1A], as in claim 1 A. Wittwer et al. teach thermocycling protocols [Col. 8] and quantitation via continuous (i.e. real time) measurement during a PCR reaction [Col. 3, lines 16-29, and Col. 3, line 61, through Col. 4, line 56], including derivative (i.e. slope) calculations as related to analyte concentration, as required in instant claim 1, part A., subpart ii). Wittwer et al. also teach PCR amplification measured in real time [Example 1, Col. 7-10] with hybridization probes requiring an amplicon melting phase as in instant claim 1, line 15). Wittwer et al. teach the calculation of linear regressions which are slopes [Fig. 1B], as instantly claimed, and derivatives, which anticipates the calculations of time interval differences in fluorescence as in instant claim 1, part A., subpart iii). Wittwer et al. teach recording cycle number [Fig. 1B] and a specific maximum of

the second derivative [Col. 9, lines 21-26] utilized to determine the initial template or target nucleic acid concentration which anticipates instant claim 1, part A., subpart iv). Figure 1a is referenced herein as showing the ranges of concentrations of interest as required in instant claim 1, part A., subpart v). Wittwer et al. also teach plot logarithmic graphs of concentration versus cycle number, and copy number [Fig. 3A], and plotting standard curves comprising concentration values against each other over time [Fig. 6], [Tables 1 and 2], which has been broadly interpreted to encompass the teaches of claim 1, part A., subpart vi) and instant claim 1, part B. Therefore, Wittwer et al. anticipates all of the limitations of claim 1.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.
>
> This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wittwer et al. (US 6,303,305, Filed: Mar. 30, 1999), in view of Ririe et al. (ANALYTICAL BIOCHEMISTRY, 1997, Vol. 245, p.154–160) and Water et al. (Anal. Chem., 1998, Vol. 70, p.5172-5176).

Wittwer et al. teach a method for real-time quantitative analysis of amplification products, as set forth above.

Wittwer et al. do not specifically teach "simultaneous amplification" of sample targets with different melting temperatures, as in claim 2. However, Wittwer et al. do teach the use of two oligonucleotide hybridization probes capable of hybridizing to adjacent but non-overlapping regions of one strand of the amplification product [Col. 6, lines 53-65], which at a minimum suggests the use of probes with different melting temperatures.

Waters et al. teach a microchip system for PCR and electrophoretic analysis [Abstract]. More specifically, Waters et al. teach a chip for simultaneous PCR amplification of multiple samples [Fig. 1], as in claim 2. Waters et al. also teach amplification of distinct regions of alpha-DNA for each of four PCR samples (i.e. first, second, and third target regions) [p.5173, Col. 2, ¶ 2], as in claim 3.

Ririe et al. teach a method of product differentiation by analysis of DNA melting curves [Abstract]. Specifically, Ririe et al. teach PCR-amplification of different target regions of DNA on the same genome using multiple Hepatitis B primers (i.e. first and second target regions from a pathogenic organism) [p.155, Col. 1, ¶ 2], as in claims 2 and 6, and establishing curves measuring dye fluorescence at different cycling temperatures and concentrations [Fig. 1 and 2], as in claim 2, step A, and claim 5. Ririe et al. also teach adding unknown amounts of templates known amounts of the control, acquiring melting curves, and resolving melting peaks [p.159, Col. 2, ¶ 2], which is a teaching for "unknown concentrations" as in claim 2, step B, and claim 4. Ririe et al. also teach curves whereby fluorescence is determined [Fig. 3 and 5], which equates to a teaching for "concentration" of samples, as in claim 4, as the amount of fluorescence is proportional to concentration. Ririe et al. also teach curves whereby cycle number, and copy numbers are determined [Fig. 3 and 5], as in claim 5.

Thus it would have been obvious to someone of ordinary skill in the art at the time of the instant invention to practice the method of Wittwer et al. with the additional melting temperature analysis technique of Ririe et al. and the single PCR microchip system of Waters et al., where the motivation to combine would have been the added benefit of a product characterization technique that is fully integrated with PCR and adaptable to simultaneous amplification [Ririe et al., p.160, Col. 1, ¶ 1] and the added benefit of a microchip technique that improves speed, cost, and automation of performing biological assay steps [Waters et al., p.5172, Col. 1, ¶ 2], resulting in the practice of the instant claimed invention. One of ordinary skill in the art would have had a reasonable expectation of successfully combining the teachings of Wittwer et al., Waters et al., and Ririe et al. as all teach methods of PCR amplification, and Ririe et al. clearly suggests combining melting temperature analysis with simultaneous PCR amplification [Ririe et al., p.160, Col. 1, ¶ 1].

CONCLUSION

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Pablo Whaley whose telephone number is (571)272-4425. The examiner can normally be reached on 9:30am - 6pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ram Shukla can be reached at 571-272-0735. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Pablo S. Whaley

Patent Examiner
Art Unit 1631
Office: 571-272-4425
Direct Fax: 571-273-4425

Lori A. Clews
4/2/07
Patent Examiner